



Context and Namespaces for Pervasive Computing

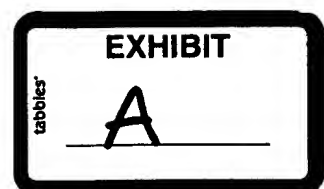
Schema Day [REDACTED]

Pierre de Vries

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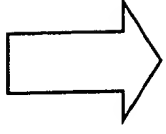
Technology Center 2600



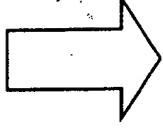
Schema Day [REDACTED]

Microsoft Confidential

Information Anywhere, Anytime, on Any device



My resources, right here, right now, on this device



Who am I? Where am I? What am I doing?
With which device(s)? On which network(s)?

Scenario Snapshots

Productivity

- Find cheapest, nearest copy shop that can make high-res prints of my photos; find bandwidth hotspot for upload; connect to it and send data, pay via expense account, get directions to shop for pickup
- Call someone urgently; find OOF messages everywhere; system finds name of secretary
- PDA reminds me of a meeting sufficiently far in advance to allow me to travel to the venue from wherever I happen to be

Socializing

- Let me know if any of my friends, co-workers engaged on Project X, or one of my investors are within 100 yards of this coffee shop
- Gossip feed: current listings of what's going on, filtered by my interests, persona and location
- Compaq person I meet at Comdex is trusted by someone I trust

Shopping

- My wedding anniversary's coming up and I'm near a gift shop –calendar/to-do list triggers a link to a nearby jewelry store
- While shopping in a mall I get alerted if a product I've been searching for on-line is available here, and helps me navigate to the boutique
- My service arbiter filters information being pushed by cloud of merchants

Snapshots 2

Travel

- Itinerary converted to appointments/todo's; airport automatically relays boarding alerts, flight changes and gate information after e-ticket check-in
- Personal device interfaces with in-vehicle device to sync itinerary, phone lists for speech dialing. Device provides driving directions to location derived from calendar and contacts.
- Check into hotel, auto-config networks, call forwarding and wake-up defaults

Device smarts

- Breaking news re certain sales account; schedule records I'm entertaining that client so it's OK to deliver after-hours; message formatted for device I'm carrying
- Enlarge font size of message on PDA if I'm walking, switch on back-light in a darkened room, ring loudly in noisy place
- While driving to the game, I get advance notice of parking situation; many parking operators vie for my business; software agent trades off price vs. proximity

Namespaces for Pervasive Computing

Contextual namespaces

- Describe/define categories of user context: user state and environment (social, physical, digital)
- Proximity metric allows efficient inference: If “close” in some dimensions, generalize efficiently to closeness (= relevance) in others
- Not necessarily hierarchical, e.g. geography; cf. high-dimensional free text retrieval engines

Category candidates (“dimensions”)

- **Devices** (██████): discover and operate devices, e.g. DC240.Kodak.still. camera or {all AV record stores}
- **Service**: commercial services provided over the network, e.g. Kinko report printing
- **Network**: communications systems and components, e.g. wireless LAN
- **Process** (██████): business or other organizational processes or protocols
- **Venue**: aggregations of individual places, e.g. a convention center
- **Spaces**: individually identifiable places, e.g. a room
- **People** (██████): individuals and groups people, e.g. user, buddy list

Combinations

- {DC240.Kodak.still.device} ⊗ {MSFT.Pierre.DeVries.hotmail.people} ⊗ {SpecialOffer.HighResPrinting.Kinkos} ⊗ {Overlake.Seattle.WA.US} ⊗ {PO-Purchase.Microsoft}

Proximity Namespace Service

An Internet-scale service that Microsoft operates

- For the benefit of products and services that use Microsoft software
- MS administers an authoritative, multi-dimensional names registry
- MS builds/maintains database against which multi-dimensional searches can be carried out

Self-populating namespace (structure and content)

- Data accumulation momentum resists cloning
 - MS doesn't necessarily store data; could merely be reliable pointer
- [REDACTED]
- [REDACTED]

Private components allowed

- With a forum's approval, anyone could add whatever they wanted in a private part of the namespace
- [REDACTED]

Value

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

User Benefits

- Make inferences which tailor information and content to a user's individual profile and location
- Enables devices to locate & access proximity-based networking & context services seamlessly
- Registration authority prevents name ambiguity
- Prevents fraud

Pervasive Computing

